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Claims

[c1] 1. Method of measurement of characteristics of a body, wherein said body comprises periodic array of more than two geometrically equivalent elements, and some or all of said elements can be absent at some moment of time, and said method comprises following:
i)digital acquisition of some fragments of image from video source at first moment of time
ii)digital acquisition of same fragments of image from video source at second moment of time
iii)comparison of individual image fragment taken at first moment of time with individual image fragment taken at second moment of time for the same fragment, wherein said comparison uses at least one pixel from said first image fragment and at least one different pixel from said second image fragment.

[c2] 2. Method of claim 1 where said image fragments are directly extracted from digital video stream.

[c3] 3. Method of claim 1 where said image fragments are extracted from whole single frame of digital video stream.

[c4] 4. Apparatus implementing method of claim 1 and comprising:

i) laser light source and collimator

ii) spatial light modulator capable of splitting of single monochrome light beam into ordered plurality of light beams

iv)objective lens

v)video capture device capable of acquiring optical images.

[c5] 5. Apparatus of claim 4 further comprising microarray of lenses.

[c6] 6. Method of measurements of characteristics of a body, wherein said body comprises periodic array of more than two geometrically equivalent elements, and some or all of said elements can be absent at some moment of time, and said method comprises following:

i) source of laser radiation

ii) optical elements capable of focusing said radiation onto surface of said body

i)optical image capture device

ii)digital acquisition of some fragments of image from said capture device at first moment of time, where in said fragments contain distribution of light intensity of a beam reflected from said focal location of said body

iii)digital acquisition of same fragments of image from

said capture device at second moment of time, where in said fragments contain distribution of light intensity of a beam reflected from said focal location of said body

iv)comparison of individual image fragment taken at first moment of time with individual image fragment taken at second moment of time for the same fragment, wherein said comparison uses at least one pixel from said first image fragment and at least one different pixel from said second image fragment.

[c7] 7. Method of claim 6 where said image fragments are directly extracted from digital video stream.

[c8] 8. Method of claim 6 where said image fragments are extracted from whole single frame of digital video stream.

[c9] 9. Apparatus implementing method of claim 6 and comprising:

i) laser light source and collimator

ii) spatial light modulator capable of splitting of single monochrome light beam into ordered plurality of light beams

vi)objective lens

vii)video capture device capable of acquiring optical images.

[c10] 10. Apparatus of claim 9 further comprising microarray of lenses.

[c11] 11. Method of claim 6 further comprising scanning of said body surface with respect to said focusing optical elements.

[c12] 12. Apparatus of claim 9 or clam 10 further implementing method of claim 10 and further comprising lateral positioning stage with positioning plane parallel to said objective lens/lenses.

[c13] 13. Method of controlling operations of plurality of micromechanical or micro electro-mechanical elements representing parts of single device, wherein said method comprises:

i) use of laser light source with output power more that five (5) milliwatt

ii)splitting said light onto plurality of beams

iii)controlling propagation of said beams using electronically controlled optical switching device

iv)focusing said beams onto surface of said device.

[c14] 14. Apparatus implementing method of claim 13 and comprising:

i)laser light source

ii)plurality of optical elements

iii)electronically controlled optical switching device.

[c15] 15. Method of measuring deformations of plurality of microcantilevers that employs method of claim 6.

[c16] 16. Method of creation of controlled deformation of microcantilevers that comprises:
i)array of microcantilevers, wherein each cantilever has light beam focused in its surface
ii)said light beam is modulated by intensity using pulse width modulation, wherein change in modulated width results in change of deflection of said cantilever.

[c17] 17. Method according to claim 16 further employing method of claim 15, wherein same light beam used in both methods.

[c18] 18. Method according to claim 17 that employs measurements of method of claim 6 to establish feedback that controls cantilever deflection.

[c19] 19. Method of generation of resonance oscillation of micro cantilever element, wherein said cantilever comprises body and attached integral lever, and wherein said method comprises:
i)first radiation beam focused on surface of said cantilever and modulated with first frequency
ii)second radiation beam focused on surface of said can-

tilever and modulated with second frequency
iii)said frequencies are adjusted so one of them or their harmonics nearly match resonance frequency of said lever.

[c20] 20. Apparatus that implements method of claim 19 to produce oscillation of plurality of cantilever elements.